EGERIA DENSA CONTROL PROGRAM

2009 ANNUAL REPORT

Submitted Pursuant to:

NPDES General Permit CAG 99005

40 CFR 122.41(k) and CFR 122.21

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate information submitted. Based on my inquiry of the persons who manage the program, Terri Ely – Senior Environmental Scientist, or persons directly responsible for gathering information, including Geoff Newman – Egeria Densa Control Program Environmental Scientist, the information submitted is, to the best of my knowledge and belief, is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including possibility of fines and imprisonment for knowing violations.

_____ _____

Lucia C. Becerra, Chief Deputy Director Date

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EXECUTIVE SUMMARY

Egeria densa (Brazilian Waterweed) is a fast growing submerged invasive aquatic plant that is having a significant impact on shallow-water habitat in the Sacramento/San Joaquin Delta ecosystem. In the past 45 years since *Egeria densa* was introduced into the Delta, it has grown to infest approximately 10,000 acres or 18% of the 55,000 surface acres of the Delta. *E. densa* influences the Delta's biological diversity, recreation, and agriculture. It crowds out native plants, slows water flows, entraps sediments, obstructs waterways, impedes anadromous fish migration patterns, and clogs water intakes both municipal and agricultural.

In 1997, AB 2193, amended the California Harbors and Navigation Code (Chapter 2, Article 2, Section 64) to designate the California Department of Boating and Waterways (DBW) as lead agency for the control of *Egeria densa* in the Sacramento/San Joaquin Delta, its tributaries, and the Suisun Marsh.

The Egeria densa Control Program (EDCP) operates under the auspices of several federal and state agencies. The United States Fish and Wildlife Service (USFWS) Biological Opinion (BO) (ref: 1-1-04-F-0148) and the National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NOAA Fisheries) (BO) (ref: SWR: 2005SA00683:JSS). The other permit required for the EDCP to operate is the National Pollution Discharge Elimination System General Permit for Aquatic Pesticide Use (NPDES) (ref: CAG 990005) issued by the State of California Water Resources Control Board (SWRCB), Division of Water Quality (DWQ) and is administered by the Central Valley Regional Water Quality Control Board (CVRWQCB). During the 2009 treatment season the DBW EDCP had no violations of either the NPDES Permit or the Biological Opinions.

Having achieved a high efficacy in the Franks Tract area of the Sacramento/San Joaquin Delta DBW searched for other areas for treatment of Egeria densa. Areas were sought where treatment would be advantageous to navigation and recreational boating. The area of White Slough, Disappointment Slough and Fourteen Mile Sloughs were selected. All areas were inundated with *Egeria densa* and in the case of Fourteen Mile Slough impassable at times of low water levels.

Prior to the 2009 treatment season the DBW conducted a dye study to determine the dissipation and retention of the herbicide when introduced into these waterways. This was a precautionary study due to the high concentration of herbicide susceptible crops along with a high number of agricultural intakes used for watering these crops.

Treatment began on April 8, 2009 and continued weekly for 12 weeks ending on June 24, 2009. Applications were made at lower than normal rates due to the high concentration of Agricultural intakes in the area. Immunoassay testing (Fastest) was accomplished weekly to ensure that no abnormal herbicide residues were present near the agricultural intakes. All tests were well below the acceptable limits for the crops being grown in the area.

In September and October the DBW also treated in two of the areas previously treated in the spring. The treatment was for six weeks one time per week. There is a second growth spurt in the early fall as plants uptake nutrients to last throughout the winter months. The object of this treatment is to determine if it would be viable to treat both in the spring and again in the fall to cause significant damage to the plants to obtain better efficacy.

Results of this second treatment will not be visible until the spring of 2010. At that time DBW will analyze data as to how much growth the plants achieved over the winter after both the spring treatment and fall treatment in these areas as compared to other areas treated with just the spring treatment.

DBW plans on continuing treatment in the areas of White Slough and Disappointment Slough in the 2010 treatment season. DBW had a successful treatment in Fourteen Mile Slough and it will not be treated during the 2010 treatment season. Dependent upon budgetary constraints DBW would like to explore treating selected portions of the south Delta during the 2010 season.

INTRODUCTION

1.1 *Egeria densa* Impact on the Delta

Egeria densa (Brazilian Elodea) is a fast growing submerged aquatic plant that is having a significant impact on the shallow water habitat in the Sacramento/San Joaquin River Delta (Delta) ecosystem. In the 50 years since *E. densa* was introduced into the Delta, it has grown to infest approximately 10,000 surface acres or 18% of the 55,000 surface acres of the Delta. *E. densa* influences the Delta's biological diversity, recreation, and agriculture. It crowds out native plants, slows water flows, entraps sediments, obstructs waterways, impedes anadromous fish migration patterns and clogs agricultural and municipal water intakes.

1.2 Setting

The EDCP area of operation includes portions of six counties that encompass much of the Delta and its upland tributaries. The six counties include Alameda, Contra Costa, Sacramento, San Joaquin, Solano and Yolo. The general boundaries for the treatment areas are:

- West to and including Sherman Island, at the confluence of the Sacramento and San Joaquin Rivers,
- North to the confluence of the Sacramento River and the Sacramento Deep Water Channel,
- East along the San Joaquin River to the city of Stockton, and
- South from Clifton Court along Old River to Mossdale.

1.3 Summary of Statutory Authority and Required Permits

In 1997, AB 2193 amended the California Harbors and Navigation Code to designate the California Department of Boating and Waterways (DBW) as lead agency for controlling *Egeria densa* in the Sacrament/San Joaquin Delta, its tributaries, and the Suisun Marsh. The United States Department of Agriculture-Agriculture Research Service (USDA-ARS) acts as the federal nexus agency for all federal regulatory processes. The USDA-ARS also provides research, technical expertise, and decision making input for the Egeria densa Control Program (EDCP) planning process. The DBW and USDA-ARS implemented the EDCP in 2001.

1.3.1 EDCP NPDES Permit (N0. CAG 990005)

The EDCP NPDES General Permit for Aquatic Pesticide Use requires the DBW to submit an annual report March 1 following the EDCP treatment season. Reporting guidelines must

include an executive summary discussing general permit compliance or violations of permit terms and conditions to waters of the U.S., the effectiveness of the EDCP Aquatic Pest Application Plan (APAP), the discharge of pollutants associated with aquatic pesticide applications, summarize monitoring data, including any changes in water quality, and violations of compliance with water quality objectives as outlined in the Central Valley Basin Plan. The report will also include a discussion of any violations and actions taken, maps showing application areas, acreage and sampling station location, types and amounts of aquatic pesticides used during the each application event, information on surface area, volume and rate of application, and sampling results for all monitoring as outlined in the General Permit Monitoring and Reporting Program.

Terms and Conditions

Herbicide Residue Limits

The maximum residue limits in receiving waters for fluridone, the main ingredient of Sonar®, is 560 parts per billion (ppb) and for diquat, the main ingredient in Reward®, the maximum is 20 ppb. The DBW did not use any diquat during the 2009 treatment season. Maximum residue limits are based on the EPA's and municipal drinking water standards.

There are clear distinctions in the NPDES Permit about the application area, treatment area, and receiving waters. An application area is defined as the area in which the aquatic herbicides are applied. The treatment area is the area that is treated by the aquatic herbicide to control aquatic weeds. The receiving waters are defined as: 1) waters directly down flow of the treatment area and 2) water within the treatment area when herbicide residue levels fall below the minimum effective concentrations. In the EDCP the herbicide can have an impact on the target species as long as residues are present in the water column. Residues found inside the treatment area are not usually considered receiving waters until seven days after an application event.

Herbicides applied to aquatic plants are not considered a pollutant until residues reach the receiving waters. This is because herbicides designed to treat aquatic plants and approved by the EPA cannot also be considered a pollutant under the Clean Water Act. This applies to chemicals approved under Federal and State pesticide use regulations.

The EPA label restrictions dictate maximum rates of application and maximum concentrations allowed in the water column. The application rate can be greater than the maximum water column concentration due to binding properties and dispersion rates in flowing waters. Fluridone has no maximum application rate in flowing waters. The applicator is allowed to apply at an appropriate rate such that the target concentration in the water column does not

exceed 40 ppb. However, most applications have target applications of 50 ppb or less with a residue of 10 ppb or less in the water column upon dispersion.

Water Quality Parameters

The EDCP is required to monitor specific water quality parameters to ensure there are no significant impacts to beneficial waters of the United States (NOAA Fisheries Biological Opinion and NPDES Permit). The physical and chemical water quality parameters monitored consist of temperature, salinity, electrical conductivity, turbidity, pH, and dissolved oxygen. DBW also conducts visual inspections before, during and after applications have been made. DBW annotates any changes in water color, odor and vegetation health.

Selection and Monitoring Frequency

The NPDES Permit requires representative monitoring for each water type found in the EDCP area of operation. The only water type for the control program is tidal. Per monitoring frequency requirements outlined in the NPDES and EDCP Aquatic Pesticide Application Plan, a minimum of two monitoring sites per water type per herbicide used if the total number of applications is below twenty. DBW records water quality parameters no earlier than twenty four hours prior to the first treatment and a minimum of two follow-up visits following the end of the treatment event or until there are no detectable residues in the water column.

1.3.2 EDCP USFWS BO/SECTION & Permit

Reporting Requirements

The USFWS Biological Opinion/Section 7 Permit requires DBW to submit an annual report no later than Jan 31 following the EDCP application season. Annual reports must summarize compliance with the terms and conditions listed to include species and habitat protection water quality monitoring, and any additional monitoring and studies that may have be conducted as part of the regulatory requirements from other participating state and federal agencies. Additional reporting requirements are on a case by case basis in the event that a *"take"* should occur with any of the species discussed in the permit. Take reports begin with immediate notification of the USFWS Biologist in charge of administering the permit and require legal documentation of such information as to where the "take" occurred, number of species involved, water quality conditions, chain of custody, and prescriptive action for preventing future occurrences.

Mitigation Requirements

The EDCP USFWS BO Section 7 Take Permit imposes several measures to avoid impacts to protected species in the Delta. Primarily DBW has been directed to implement species

avoidance and habitat loss minimization. There are three main components to avoidance and habitat minimization mitigation. Components are seasonal timing of applications, species specific toxicity evaluations, and education of applicators. All applicators received worker environmental awareness training before treatments started in April of 2009. Personnel were informed as to the presence of the Valley Longhorn Elderberry Beetle and the habitat associated with this species, other specific mitigation for the Giant Garter Snake and Delta Smelt. The briefing also included the contents of both the USFWS and NOAA Fisheries BO Section 7 Permits.

Delta Smelt (*Hypomesus transpacificus*)

1 – Using the Interagency Ecological Program (IEP) Real Time Monitoring Program 20 mm Survey determine the presence/absence of Delta Smelt within or near herbicide application areas

2 – There are no restrictions for the use of fluridone, however, if diquat is used it may only be applied between June 1 and Jul 31. DBW used no diquat during this reporting period.

Valley Longhorn Elderberry Beetle (*Desmocerus californicus dimorphus*)

The Valley Longhorn Elderberry Beetle is in the federal process of being de-listed. However, DBW will continue o monitor and observe all mitigation set forth by the USFWS.

1 – Avoidance is the primary term that USFWS has included in their Biological Opinion

2 – The area of operation for the EDCP has been surveyed as to the location of the Elderberry tree (*Sambucus ssp*) and there are none within the area of operation for 2009.

Giant Garter Snake (*Thamnophis gigas*)

1 – Avoidance of Giant Garter Snake Habitat

The only restrictions to the Giant Garter Snake apply to mechanical harvesting and land based operations occurring on unimproved Delta banks. The EDCP currently is not implementing mechanical harvesting nor is it operating on or near any unimproved areas. However, mitigation beyond the requirements of the USFWS permit has been implemented to avoid impact. All of the EDCP project area has a Giant Garter Snake habitat evaluation. Each application crew has been provided with a set of maps outlining potential Giant Garter Snake habitat. This is to ensure that our crews avoid areas where Giant Garter Snakes are likely to be found.

1.3.3 EDCP NOAA Fisheries B/O Section 7 Permit

Reporting Requirements

The NOAA Fisheries Biological Opinion Section 7 Permit requires DBW to submit an annual report January 31 following the EDCP application season. Annual reports must summarize compliance with the terms and conditions listed to include species and habitat protection, water quality monitoring, and any additional monitoring and studies that may have been conducted as part of the regulatory requirements from other participating state and federal agencies. Additional reporting requirements are on a case by case basis in the event a "take" should occur with any of the discussed species in the permit. Take reports begin with immediate notification of the NOAA Fisheries biologist in charge of administering the permit and require legal documentation of such information as to where the *"take"* occurred, number of species involved, water quality conditions, chain of custody, and prescriptive action for preventing future occurrences.

Mitigation Requirements

Chinook Salmon, *Onorchynchus tshawytscha* (Sacramento River winter run and Central Valley Spring run) and Central Valley Steelhead Trout, *Oncorhynchus mykiss*

1 – NOAA Fisheries has given DBW specific start and stop dates which a treatment can begin and when it must end. DBW cannot start treatments before April 1st and must end all treatments no later than October 15th

2 – NOAA Fisheries has also set specific sites and dates when a treatment can start. This is to preclude both out and in migrating salmonids from passing through treated areas

3 – In order to avoid impacts to aquatic species, particularly salmonids, reliant on dissolved oxygen (DO) levels, crews monitor DO levels and water temperature prior to and after treatments. Crews are only permitted to make applications when DO levels are above 5 mg/l or below 3 mg/l. During the 2009 season all DO levels were within the specific parameters[1].

[1] The CVRWQCB, USFWS, and NOAA Fisheries have slightly different dissolved oxygen limits. The CVRWQCB Basin Plan states the DO shall not be reduced below 5.0 mg/l in all Delta waters, except the Sacramento River below the I Street Bridge and waters west of the Antioch Bridge (7.0 mg/l) and in the San Joaquin River between Turner Cut and Stockton (6.0 mg/l). All EDCP sites are by the Basin Plan definition waters of the Delta. The USFWS BO/Take Permit directs no treatment in high flow areas where DO levels are below 5.0 mg/l. It also directs treatments to be delayed in low flow areas if DO levels are between 4-6 mg/l. The Central Delta is all tidal and with no real distinction between high flow and low flow waters. During the 2009 treatment season DBW recorded most readings above 5.0 mg/l. However there were 3 readings below 5.0 mg/l they were 3.17 mg/l and 4.71 mg/l on July 1, 4.51 mg/l on July 9 and

3.72 mg/l on July 16. All readings were recorded in 14 Mile Slough at low tide and in very shallow water.

PERSONNEL, METHODS AND MATERIALS

2. 1 EDCP Personnel, Accreditation, and Training

Application Crew

Application Crews

Each application crew consists of a specialist and a technician of which at least one is a certified applicator possessing a Qualified Applicator Certificate "F" (aquatics). This certification is administered by the California Department of Pesticide Regulation (DPR). All DBW crews have been trained on EDCP herbicide use and environmental awareness.

Endangered Species Training

DBW perceives training as a major component necessary to ensure avoidance and minimization measures are met for both the NOAA Fisheries and USFWS BO Sec 7 Permits. Application crews not only received refresher training on herbicide use and restrictions before the application season began, they also received an annual environmental awareness refresher course on EDCP threatened and endangered species and species of concern. State and federally listed threatened and endangered species and species of concern training for the EDCP project area included; a discussion of legal implications of the Endangered Species Act (ESA) and the California Endangered Species Act (CEQA), Identification of all endangered and threatened species and species of concern in the project area, Special permit requirements for Delta Smelt, Giant Garter Snake, Valley Longhorn Elderberry Beetle, Central Valley Steelhead Trout, and Chinook Salmon including buffer zones, required surveys, fish passage protocol, and DO limits.

Monitoring Crews

Monitoring crews consist of a lead Environmental Scientist and one additional person to assist the scientist. The lead scientist is responsible for training, planning, and scheduling field sampling events. Additional responsibilities include quality control (QA/QC) of field water quality monitoring and lab analysis and the reporting of findings in an annual report as outlined in the EDCP NDES, USFWS and NOAA Fisheries Biological Opinions.

2.2 Materials

2.2.1 Herbicide Application

Herbicides

Herbicides used during the 2009 EDCP treatment season include:

• Fluridone: 1-methyl-3-phenyl-5[3-(trifluoromethyl_phenyl]-4(1H)-pyridinone; under the commercial trade names of:

Sonar A.S. ® – EPA Registration No. 67690-4 (liquid)
Sonar PR Precision Release® – EPA Registration No 67690-12 (Pellet)
Sonar Q Quick Release® – EPA Registration No. 67690-3 (Pellets)

Fluridone

Fluridone (Sonar®) is a selective systemic herbicide that inhibits the formation of carotene, an action that results in the degradation of sunlight exposed chlorophyll. Formation of carotene occurs primarily in new growth, thus fluridone is most effective in maximum growth periods of *E. densa*. Fluridone not absorbed by plants is broken down into naturally occurring elements mostly through exposure to sunlight.

Summary of Pesticide Use in 2009

	Fluridone PR Granular (lbs)	Fluridone PR Granular (acres)	Fluridone Q Pellets (lbs)	Fluridone Q Pellets (acres)
April				
San Joaquin	1436	311.3	2772	467.8
May				
San Joaquin	1714	651.2	346	151.4
June				
San Joaquin	2329	603.1	499	218.6
September				
San Joaquin	343	57	1035	155
October				
San Joaquin	768	84.8	0	0
TOTALS	**6590**	**1707.4**	**4652**	**992.8**

NOTE: Acreages in table are gross acreages. Net acreage treated was 227.8 acres.

Application Equipment

Crews use either a 19-21 foot aluminum boat either air or outboard powered. At the start of each treatment the application crew will take a dissolved oxygen and water temperature reading using a HACH Dissolved Oxygen Meter within the treatment site. These readings must be within the parameters outlined in the Biological Opinions and NPDES Permit before application of any herbicide is started. At the start of the application the crew will use an Explore™ iX-104C² Tablet PC with GPS unit installed to record beginning and ending spray lines, coordinates of spray area and the time of the treatment.

All boats are maintained regularly, including oil changes every 50 engine hours, washed to rid them of chemical residues, and all application pumps, hoses and nozzles are inspected and if defective are replaced on an as needed basis. Boat maintenance records are available upon request.

2. 3 Environmental Monitoring

Monitoring Equipment

A 21 foot aluminum Gregor™ or 22 foot fiberglass C-Dory vessel both powered by outboard motors are used for monitoring activities. DBW uses a Hydrolab MS-5® water quality multi-probe Datasonde. The MW-5 collects readings of water temperature, electrical conductivity, salinity, dissolved oxygen, pH, and turbidity. The data is stored together with GPS coordinates with an I-xplore 104C² PC Tablet. A digital camera is used to obtain visual records of sampling locations to denote noticeable changes in vegetation or the condition of the surrounding area.

Monitoring Activities

Environmental Monitoring Protocols

The DBW EDCP follows a water quality monitoring protocol as outlined in the in the 2004 EDCP Aquatic Pest Application Plan (APAP). The monitoring team plans each sampling event in coordination with the field supervisor and the application teams. Each site is representative of the water types found in the Delta. During the 2009 season DBW sampled all sites treated.

Residue Sampling

For each application event DBW takes a pre-sample and as many post samples as necessary until a non-detection of the herbicide is obtained. These samples are identified as sample location A, B, and C. Sample location A is inside of the application area approximately ¼ to 1/3 the distance in from the downstream edge of the application polygon, sample location B is located on the downstream outside edge of the application polygon, and sample location C is located in an adjacent non-impacted location with similar hydrological conditions as the application site or receiving waters.

DBW also takes weekly Fastest™ (immune assays) samples throughout the duration of treatment. These samples are sent to the herbicide manufacturer for analysis. The sample results are used to monitor herbicide residues in the treatment area as well as areas outside of the treatment area. Dependent upon the residue levels DBW can monitor and adjust the rate of application to keep residue levels within the treatment site at optimum levels.

Water Quality Parameters

Water quality sampling is done concurrent with the residue sampling. Water quality parameters monitored are water temperature, dissolved oxygen levels, pH, turbidity, electrical conductivity, and salinity. All samples are taken at a depth of three feet. DBW also conducts

visual inspections of the treated and surrounding areas to identify changes in water color or odor and also changes in vegetation health.

2.4 Laboratory Analytical Methods and Data Validation

Analytical Methods

The analytical methods used by the contract laboratories, California Department of Food and Agriculture (CDFA) and California Department of Fish and Game, Water Pollution Control Laboratory (DFG), are published in the U.S. EPA Test Methods for Evaluating Solid Waste Physical/Chemical SW 846 or U.S. EPA Method for Chemical Analysis of Water and Waste. The primary method used for the EDCP is Method 4000, immune assay testing (ELISA method).

Analytical Testing Validation

DBW uses several methods to validate results found by contracting laboratories. These methods are split samples, outside laboratory split samples, field spikes, field blanks, and equipment blanks. All validation samples were well within acceptable ranges.

Efficacy Monitoring

Hydroacoustic Analysis

Hydroacoustic studies performed by Ruch Logic involve monitoring of application sites and untreated control sites similar to the application sites. Using sonar type technology, vegetative cover (Bio-Cover) on the water body floor and the amount of vegetative plant matter present (Bio-Volume) are measured. Linear transects are used to sample vegetation for ground truthing and inventories of submerged species present and their physiological condition at the time of sampling.

3 - COMPLIANCE

3.1 Herbicide Application Data and Permit Compliance

The 2009 EDCP application season was from April 7, 2009 to October 15, 2009. DBW treated in Disappointment Slough, 14 Mile Slough, and White Slough. Total of 227.8 net acres was treated.

Compliance

DBW EDCP treatment operations were in compliance with all portions of the NPDES, Aquatic Pesticide Application Plan, USFWS BO, and the NOAA BO. There were no known take or harassment of federally endangered or threatened species.

Basin Plan Compliance (NPDES)

DBW is required to adhere to all limitations set forth in the Regional Water Quality Control Boards Basin Plan. They have set limitations for dissolved oxygen, turbidity, pH, salinity, and temperatures.

Dissolved Oxygen

The limits set forth in the Basin Plan are that no dissolved oxygen levels should be below 6.0 mg/l in the San Joaquin River between Turner Cut and Stockton from September 1 to November 30, and 5.0 mg/l in all other waters of Delta. DBW recorded four readings of below 5.0 mg/l on three separate occasions. These readings were 3.17 and 4.71 mg/l on July 1, 4.51 mg/l on July 9, and 3.72 on July 16. All readings were in the eastern most portion of 14 Mile Slough and were taken at low tide. All other dissolved oxygen readings were between 5.07 mg/l and 14.71 mg/l.

pH

The limits for pH in the Basin Plan are no readings below 6.5 or elevated above 8.5. DBW recorded readings between 6.51 and 7.85 during the 2009 treatment season.

Turbidity

For Delta waters the turbidity levels for the central Delta shall not exceed 50 Nephelometric Turbidity Units (NTUs) and 150 NTUs for other areas of the Delta. DBW recorded readings between 1.2 and 22.6 NTUs.

4 - DISCUSSION AND CONCLUSIONS

4.1 Discussion

DBW started treating another area of the Central Delta during the 2009 treatment season. The reason for the move was overall success in Franks Tract and the need to clean areas of the east Delta. The areas selected were Disappointment Slough, White Slough and 14 Mile Slough.

Due to the large number of agricultural water intakes the DBW had to be very careful to not damage any crops using the Delta waters for irrigation. First step was to find out how the water flowed through the myriad of islands in all three sloughs. To do this DBW, in coordination with USDA Agriculture Research Service and SePro Inc. the supplier of herbicides used by DBW conducted a dye study within the area of proposed operation. The results of this study determined the rates and location at which the herbicide was applied. A copy of the dye study is located in Appendix B of this report. Second step was to ensure that residues did not go above acceptable levels. This was accomplished using extensive monitoring and the Fastest immunoassay procedure. These tests were conducted weekly and results were provided so that DBW could regulate the application rates of the herbicide.

4.2 Herbicide Application Compliance

All applications performed by DBW during the 2009 treatment season were in compliance with the Pesticide Control Recommendation (PCR), the USFWS Biological Opinion, the NOAA Biological Opinion, and the NPDES Permit

4.3 Conclusions

The following conclusions are the results of analysis between the 90 day and 240 day hydroacoustic sampling. This data is not complete due to a change in contractors who perform the hydroacoustic analysis. The pre-sampling data was not available during the writing of the Annual Report. As soon as the data is received from the previous contractor a revision of the Annual Report will be accomplished and forwarded to all agencies involved. Below is the current analysis of data for the 90 and 240 day sampling event.

Fourteen Mile Slough: Based on analysis of Post 90 Days through Post 240 Days 2009 Treatment data, both bio-coverage and bio-volume of *Egeria densa* and associated SAV are at their lowest levels Post 90 day's treatment. Through EDCP management efforts, the ~60-acre treatment region was void of noxious *Egeria densa* inhabiting and obstructing boat traffic lanes in this backwater region during the important boat traffic intense summer months of July - September. Through the 2009 monitoring period, slight (less than ~5%) increases in bio-

coverage and bio-volume of *Egeria densa* and associated SAV were quantified and qualified during the Post 90 through Post 240 day's treatment periods. This trend is to be expected, *Egeria densa* and other SAV in the shallow water habitats of the SSJD tend to experience growth cycles, and in this case, mild re-growth during the warm water months punctuated by a sharper growth spurt as a result of the cooling waters in the early- to mid-Fall time frames. Non-Treatment comparative study areas in the greater Fourteen Mile Slough Region prove heavy, noxious communities of *Egeria densa* and associated SAV absent of direct treatment throughout the time period under review. However, it must be noted that although the EDCP's efforts to control *Egeria* were efficacious, presence of emergent and free-floating surface vegetation, for example native Floating Pennywort, (*Hydrocotyle ranunculoides*) obstructed boat lanes during the early summer months and diminished by the late fall sampling periods.

Disappointment Slough: Based on analysis of Post 90 Days through Post 240 Days Treatment data, both bio-coverage and bio-volume of *Egeria densa* and associated SAV are at their lowest levels Post 90 days Treatment. Through EDCP management efforts, the ~85-acres of direct treatment that took place during 2009 stifled sharp growth patterns during the water-warming months of April and May. Chlorotic damage to *Egeria densa* tissue was noted during the Post 90 Day study period as well as lower biomass in comparison to untreated sites in the greater Disappointment Slough Region. Ancillary SAV species including Coontail, (*Ceratophyllum demersum)* and Eurasian Water Milfoil, (*Myriophyllum spicatum),* both susceptible to the active ingredient Fluridone, displayed signs of chlorotic damage as well as a decrease in coverage and volume intensity throughout the study period. It must be noted that although these two species are considered highly invasive and noxious in most systems of the United States, they are not the current focus of management in the EDCP. However, the EDCP is learning that while controlling the target species, *Egeria densa,* has become attainable, the program might very well have to learn how to manage other exotic invaders such as Cabomba/Fanwort (*Myriophyllum spicatum*) moving into the second decade of the EDCP's existence.

White Slough: Based on analysis of Post 90 Days through Post 240 Days Treatment data, both bio-coverage and bio-volume of *Egeria densa* and associated SAV are at their lowest levels Post 90 days Treatment. Through EDCP management efforts, the ~80-acres of direct treatment that took place during spring 2009 helped manage sharp spring growth cycles. Slight chlorotic tissue damage was witnessed in regions of White Slough during the ~Post 90 Day observation periods proving herbicidal exposure. Similar to Disappointment Slough, associated invasive and noxious SAV species including (*Myriophyllum spicatu) and* Cabomba/Fanwort, (*Cabomba caroliniana)* both were managed by the 2009 White Slough Treatment. Continued seasonal growth and re-

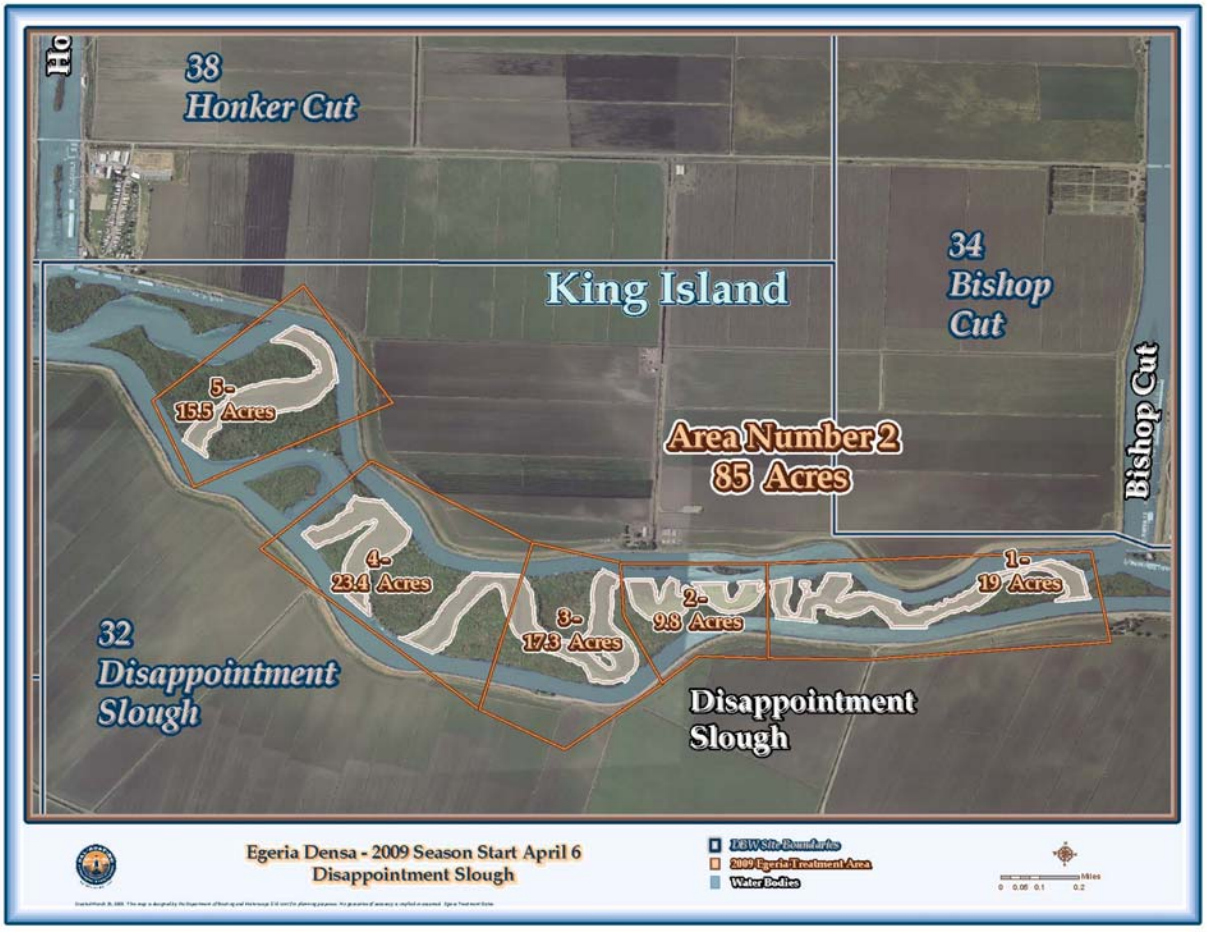
growth of *Egeria densa* took place in the summer and fall water-cool-down months in White Slough between the ~Post 90 and ~Post 240 Days Treatment periods.

APPENDIX A

1 – Site Maps for Disappointment Slough, White Slough and 14 Mile Slough

2 – Water Quality and Chemical Residue Data for all sites Sampled in 2009

Disappointment Slough Site 32



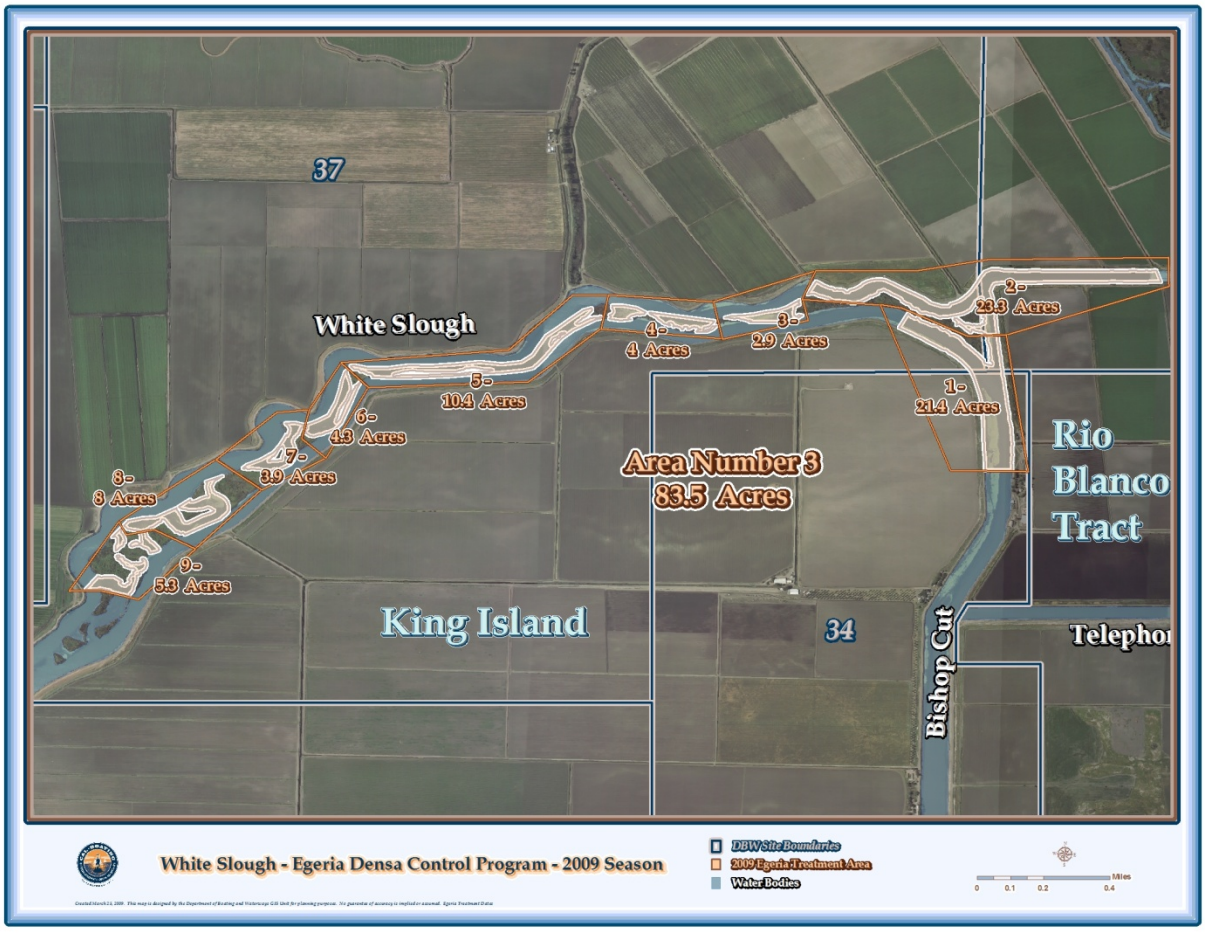
Eastern Side of Disappointment Slough

Sample Location	Sample Number	UTM	Date	Time	Temp	Conductivity (ms/cm)	Salinity (ppt)	DO (mg/l)	Depth	pH	Turbidity	Residue Level
A	E32E-040709-001	E638113 N4211646	4/7/09	1035	16.11	0.303	0.15	10.34	3	7.29	3.4	ND
B	E32E-040709-002	E638614 N4211706	4/7/09	1030	16.10	0.309	1.15	11.7	3	7.85	6.0	ND
C	E32E-040709-003	E639954 N4210705	4/7/09	1015	16.28	0.323	0.16	11.82	3	7.21	8.1	ND
A	E032-070109-026	E637364 N4211709	7/1/09	1013	24.26	0.133	0.06	8.71	3	6.56	22.6	ND
B	E032-070109-028	E639949 N4211556	7/1/09	1003	25.2	0.144	0.06	6.57	3	6.65	4.8	ND
C	E032-070109-030	E639949 N4210733	7/1/09	0956	24.93	0.146	0.06	6.54	3	6.63	6.5	ND
A	E032-070909-042	E637763 N4211627	7/9/09	1230	24.76	0.109	0.04	7.73	3	7.03	5.1	ND
B	E032-070909-043	E639706 N4211601	7/9/09	1215	24.51	0.134	0.06	8.02	3	7.03	6.3	1.1
C	E032-070909-044	E639948 N4210633	7/9/09	1210	24.49	0.137	0.06	8.81	3	7.03	11.1	ND

Western Side of Disappointment Slough

Sample Location	Sample Number	UTM	Date	Time	Temp	Conductivity (ms/cm)	Salinity (ppt)	DO (mg/l)	Depth	pH	Turbidity	Residue Level
A	E32W-040709-005	E636290 N4211867	4/7/09	1045	15.84	0.293	0.14	10.35	3	7.25	.8	ND
B	E32W-040709-006	E635272 N4212680	4/7/09	1055	15.87	0.285	0.14	10.01	3	7.17	2.4	ND
C	E32W-040709-007	E633282 N4211472	4/7/09	1105	16.06	0.274	0.13	10.80	3	7.17	19.0	ND
A	E032-070109-033	E636040 N4212184	7/1/09	1043	24.77	0.128	0.05	7.29	3	6.72	3.9	ND
B	E032-070109-035	E634666 N4212758	7/1/09	1034	24.61	0.104	0.04	6.50	3	6.67	4.3	ND
C	E032-070109-037	E633279 N4211463	7/1/09	1028	24.60	0.122	0.06	6.72	3	6.67	4.5	ND
A	E032-070909-038	E635998 N4212203	7/9/09	0846	22.96	0.088	0.03	6.14	3	7.26	4.0	ND
B	E032-070909-039	E634643 N4212737	7/9/09	0838	22.80	0.067	0.02	7.10	3	7.32	3.7	ND
C	E032-070909-036	E633274 N4211457	7/9/09	0830	22.40	0.046	0.01	7.75	3	7.38	3.9	ND
A	E032-081109-071	E637725 N4211612	8/11/09	1040	24.46	0.070	0.02	6.46	3	7.05	1.9	ND
B	E032-081109-072	E639683 N4211599	8/11/09	1030	24.77	0.075	0.02	6.63	3	7.02	2.1	ND
C	E032-081109-073	E639948 N4210628	8/11/09	1023	24.76	0.81	0.03	7.32	3	7.02	3.5	ND

White Slough Sites 37



Eastern Side of White Slough

Sample Location	Sample Number	UTM	Date	Time	Temp	Conductivity (ms/cm)	Salinity (ppt)	DO (mg/l)	Depth	pH	Turbidity	Residue Level
A	E37E-040709-008	E638071 N4216453	4/7/09	1145	16.50	0.29	0.14	14.71	3	7.45	6.7	ND
B	E37E-040709-009	E638968 N4215359	4/7/09	1155	16.38	0.28	0.14	12.02	3	7.68	1.2	ND
C	E37E-040709-010	E638703 N4214170	4/7/09	1200	16.81	0.29	0.14	13.69	3	7.81	5.7	ND
A	E036-070109-019	E638100 N4216439	7/1/09	1139	25.20	0.11	0.04	8.25	3	6.71	8.4	ND
B	E036-070109-021	E638975 N4215373	7/1/09	1156	25.46	0.13	0.06	8.43	3	6.97	7.3	ND
C	E036-070109-023	E638724 N4214270	7/1/09	1151	26.46	0.17	0.07	8.60	3	6.93	8.0	ND
A	E037-070909-049	E638099 N4216439	7/9/09	1001	23.41	0.06	0.02	8.68	3	7.13	4.1	ND
B	E037-070909-050	E638978 N4215375	7/9/09	1009	24.09	0.13	0.05	10.85	3	7.44	8.3	ND
C	E037-070909-051	E638716 4214270	7/9/09	1024	24.70	0.11	0.05	11.42	3	7.66	11.4	ND

Western Side of White Slough

Sample Location	Sample Number	UTM	Date	Time	Temp	Conductivity (ms/cm)	Salinity (ppt)	DO (mg/l)	Depth	pH	Turbidity	Residue Level
A	E37W-040709-011	E635638 N4215326	4/7/09	1135	16.06	0.22	0.10	10.21	3	7.22	10.7	ND
B	E37W-040709-012	E635184 N4214538	4/7/09	1130	15.59	0.22	0.10	12.65	3	7.21	3.1	ND
C	E37W-040709-013	E633730 N4216327	4/7/09	1120	16.07	0.19	0.09	11.63	3	7.10	1.3	ND
A	E037-070109-027	E635453 N4215551	7/1/09	1127	24.24	.079	0.02	9.43	3	6.81	2.6	1.2
B	E037-070109-029	E634803 N4214799	7/1/09	1117	24.42	.069	0.02	6.99	3	6.75	10.9	ND
C	E037-070109-031	E633443 N4216352	7/1/09	1109	24.23	.069	0.02	7.54	3	6.66	15.9	ND
A	E037-070909-046	E635953 N4215549	7/9/09	0944	22.90	.055	0.01	5.55	3	7.07	6.9	ND
B	E037-070909-047	E634815 N4214795	7/9/09	0937	22.41	.043	0.01	7.45	3	7.18	4.6	ND
C	E037-070909-048	E633442 N4216351	7/9/09	0930	22.06	.025	0.0	7.88	3	7.05	7.1	ND
A	E037-071609-063	E635953 N4215544	7/16/09	1052	24.50	.040	0.01	8.27	3	6.65	0	1.4
B	E037-071609-064	E634801 N4214796	7/16/09	1044	23.50	.027	0.01	7.42	3	6.65	0	ND
C	E037-071609-065	E633442 N4216350	7/16/09	1033	23.41	.27	0.2	7.98	3	6.59	0	ND
A	E037-081109-067	E635950 N4215549	8/11/09	1125	23.63	.046	0.01	6.31	3	6.90	2.1	ND
B	E037-081109-068	E634816 N4214795	8/11/09	1115	23.48	.050	0.01	7.56	3	7.01	1.8	ND
C	E037-081109-069	E633445 N4216350	8/11/09	1106	23.37	.042	0.01	8.04	3	6.97	2.4	ND

14 Mile Slough Site 26

14 Mile Slough

Sample Location	Sample Number	UTM	Date	Time	Temp	Conductivity (ms/cm)	Salinity (ppt)	DO (mg/l)	Depth	pH	Turbidity	Residue Level
A	E026-040709-014	E643081 N4206762	4/7/09	0945	16.27	0.57	0.29	6.06	3	6.86	13.3	ND
B	E026-040709-015	E643061 N4207405	4/7/09	0950	16.43	0.54	0.28	9.00	3	6.86	9.1	ND
C	E026-040709-016	E641907 4208481	4/7/09	1005	16.23	0.58	0.30	9.27	3	6.86	10.4	ND
A	E026-070109-018	E643083 N4206729	7/1/09	0905	25.97	0.45	0.23	3.17	3	6.51	5.8	ND
B	E026-070109-020	E643092 N4207529	7/1/09	0855	26.17	0.43	0.21	4.71	3	6.44	7.4	1.3
C	E026-070109-022	E641910 N4208486	7/1/09	0846	26.15	0.39	0.19	6.10	3	6.36	11.4	ND
A	E026-070909-053	E643305 N4206723	7/9/09	1123	25.42	0.39	0.20	4.51	3	7.10	9.6	1.5
B	E026-070909-054	E643106 4207548	7/9/09	1108	25.61	0.35	0.17	5.91	3	7.34	10.0	1.4
C	E026-070909-055	E641928 N4208496	7/9/09	1100	24.96	0.30	0.15	6.49	3	7.43	11.2	ND
A	E026-071609-057	E643038 N4206736	7/16/09	0944	26.17	0.39	0.19	3.72	3	6.51	0	1.5
B	E026-071609-058	E643102 4207538	7/16/09	0934	26.31	0.32	0.16	6.16	3	6.53	0	1.5
C	E026-071609-059	E641929 N4208480	7/16/09	0927	26.26	0.27	0.13	6.55	3	6.51	0	ND
A	E026-081109-075	E643031 N4206739	8/11/09	0955	25.90	0.23	0.10	5.07	3	7.11	6.8	ND
B	E026-081109-076	E643113 N4207541	8/11/09	0945	25.92	0.22	0.10	5.74	3	7.08	6.2	
C	E026-081109-077	E641921 N4208478	8/11/09	0936	25.39	0.24	0.11	5.38	3	7.10	4.4	

APPENDIX B

1– Pesticide Use Recommendation

2 – Dye Study Information

3 – Application Crews Daily Logs

4 – CDFA Laboratory Residue Results

5 - FastTest Results

California Agriculture Pest Control Recommendation

Aquatic Herbicide Application

Pest Control Advisor: **Kevin Naylor**
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Visalia, CA 93292
Mobile: (916) 955-2464
Voice/Fax: (317) 428-4594

License Number: 01151

NOTE: All products recommended below are non-agriculture, general use herbicides.

1) Owner of treatment site: Sacramento-San Joaquin Delta, CA Department of Boating and Waterways (lead management agency)

2) Product Name: Sonar AS (liquid), Sonar Precision Release (pellet), Sonar Quick Release (pellet)

3) Application Rate: See attached details. Sonar pellets (Q and PR) rates will range from 5-30 ppb per application. Treatment protocol is designed to maintain 1-5 ppb of fluridone in the water column during the treatment period. Sonar AS may be used during the program to supplement in water concentration, at a per application rate 1-10 ppb.

4) Water Use Restrictions: See label recommendations. Water from Sonar treated areas can be immediately used for swimming, fishing and potable uses.

Water users are not expected to be impacted by the treatments scheduled under this Sonar program in 2009. In addition, FasTest immunoassay will be used to determine actual Sonar concentration present in the treatment zones and near irrigation intakes during the entire treatment program. The following guidelines (as specified on the product label) will be implemented should water from these treatment sites be needed for irrigation purposes.

Water from the Sonar treated areas should not be used to irrigate established turf, row crops and tree crops if Sonar concentrations are greater than 10 ppb. Water from the Sonar treated areas should not be used to irrigate newly seeded grasses, tobacco, tomatoes, peppers and other plants in the Solanaceae family until Sonar concentrations are 5 ppb or lower. Do not use Sonar treated water for irrigation greenhouse or nursery plants until Sonar concentrations are <1 ppb.

5) Targeted Aquatic Weed or Algae: **Dominant problem species**: Brazilian elodea, *Egeria densa*

6) Recommended Treatment Protocol:

a) Time/Schedule or Conditions: Start date will be approximately April 6th.

b) Total Acreage: 250-260 acres in the NE Region of the central delta (Disappointment, White Slough, Fourteen Mile Slough) and Meadows Slough. Water volumes for the 2009 treatment area will be based upon the most recent volume calculations from ReMetrix surveys and maps completed in March 2009. In addition, Sonar treatment may occur in Franks Tract pending future Egeria surveys. A site specific treatment plan for each site will be amended to this recommendation as needed.

c) Concentration (ppb): see attached - Sonar AS 1-10ppb per application, Sonar Q and PR 5-30 ppb per application.

d) Criteria used determining the need for the treatment (alternative assessment): CA Department of Boating and Waterways has been designated the lead agency to develop and implement a control program for the aquatic weed *Egeria densa* in the Sacramento-San Joaquin Delta, Egeria Densa Control Program (EDCP). The primary objective of this program is to improve navigation in currently infested areas of the Delta by reducing the growth and spread of *Egeria*. An Environmental Impact Report (EIR) was completed in 2000 and updated in 2006 to address potential impacts of the EDCP program. The attached Sonar treatment program for 2009, follows the treatment protocols outlined in the EIR, as well as the specific treatment guidelines established by state and federal agencies; State Water Resources Control Board, CA Department of Fish and Game, US Fish and Wildlife and National Oceanic and Atmospheric Administration. The EDCP and EIR also outline other aquatic herbicide and mechanical control methods for control of *Egeria* in the Delta beyond those scheduled with this Sonar treatment program.

The use of FasTEST immunoassay will be used for monitoring Sonar concentrations throughout the entire 2009 management program. FasTEST data will also be used to make the necessary adjustment to treatment frequency and rates (within label specifications) to achieve optimum control and monitor concentration at irrigation intakes.

7) Expiration Date of Recommendation: October 31, 2009

Kevin Naylor 4-2-09

Kevin Naylor
SePRO Corporation
Pest Control Advisor
3/27/2009